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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/887,584	10/01/2007	Hiroyuki Nagasaka	134153	5058

EXAMINER	
KREUTZER, COLIN WRIGHT	

ART UNIT	PAPER NUMBER
2882	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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REJECTION

SEP 29 2010

SEP 29 2010

DOCKETED
By SM on 6/29 2010
and
By aa on 6/29 2010
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Office Action Summary	Application No. 11/887,584	Applicant(s) NAGASAKA ET AL.	
	Examiner COLIN KREUTZER	Art Unit 2882	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 23-26 and 36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 27-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/05/2007, 12/08/2009, 2/02/2010</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species A, corresponding to claims 1-22, 27-35, 37 in the reply filed on 4/02/2010 is acknowledged. The traversal is on the ground(s) that the search and examination of the entire application could be made without serious burden. This is not found persuasive because the details of the different species would result in different fields of search which are not coextensive, thereby constituting a serious burden.

Applicant further submits that claim 36 belongs with Species A because it does not recite the heat radiating member of Species F. This is not found persuasive because claim 36 requires that "a change in the temperature of the immersion space forming member is suppressed by radiation of heat" which implicitly requires a heat radiating member.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1, 28** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For claims 1 and 28, the phrase "deactivation of formation of the immersion space" is unclear. Specifically, the claim language does not specify whether

"deactivation of formation of the immersion space" refers to a completion of the filling of an immersion space or to a completion of the removal of liquid from an immersion space. For examination purposes, the phrase "accompanying deactivation of formation of the immersion space" will be interpreted to mean "after the liquid in the immersion space has been removed" consistent with claims 2 and 29, as well as paragraph 34 of the published application.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-5, 7-9, 11-13, 27-30, 32-33** are rejected under 35 U.S.C. 102(e) as being anticipated by Cadée et al (US 2006/0033892, cited in IDS).

For claims 1, 27-28 and 37, Cadée et al teach a device manufacturing method (par. 15) an exposure method and exposure apparatus (fig. 1 par. 41) that exposes a substrate W via a first liquid filled into an optical path space of exposure light (fig. 5 par. 58), the apparatus comprising:

an immersion space forming member 12 that fills the optical path space with the first liquid to form an immersion space 25 (fig. 5 par. 58); and

a temperature regulating mechanism 220 that suppresses a change in the

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temperature of the immersion space forming member 12 (fig. 12 par. 82) accompanying deactivation of formation of the immersion space (wherein mechanism 220 compensates heat loss due to evaporation of immersion liquid, par. 82, which occurs, among other reasons, due to residual liquid between a substrate W and immersion space forming member 12, par. 75); and alternatively or additionally,

a temperature regulating mechanism 410 that suppresses a change in the temperature of the immersion space forming member 12 (fig. 14 par. 87) accompanying deactivation of formation of the immersion space (wherein mechanism 410 compensate heat loss due to evaporation of immersion liquid by supplying a heat-exchange fluid to immersion space forming member 12);

For claims 2 and 29, Cadée et al teach that the first liquid is removed from the optical path space in the deactivation of formation of the immersion space (via outlets indicated by arrows in fig. 5).

For claim 3, Cadée et al teach that the immersion space forming member 12 has at least one of a supply port that supplies the first liquid to the optical path space and a recovery port that recovers the first liquid in the optical path space (par. 5, inlets and outlets indicated by arrows in fig. 5, including a dedicated liquid recovery outlet as well as exhaust pipe 14, which is configured to remove both gas and evaporated immersion liquid, par. 58 fig. 5).

For claims 4-5 and 30, Cadée et al teach that the immersion space forming member 12 includes a nozzle member 12 in which at least one of the supply port and the recovery port is provided (fig. 5 par. 5), and the first liquid is held in at least a portion

between the nozzle member 12 and the substrate W on a light exit side of a final optical element of projection optical system PL when the substrate W is irradiated with the exposure light (fig. 5 par. 3).

For claims 7 and 32, Cadee et al teach that the temperature regulating mechanisms 220 and 410 suppress a drop in the temperature of the immersion space forming member 12 caused by the heat of evaporation of the first liquid as applied to claims 1 and 28 above.

For claims 8 and 33, Cadee et al teach that the temperature regulating mechanisms 220 and 410 suppress a change in the temperature of the immersion space forming member by using a temperature regulating fluid (wherein the temperature regulating mechanism 410 comprises a temperature regulating fluid, fig. 14 par. 87, and member 220 heats a gas which flows into exhaust inlet 14, fig. 12 par. 82; Cadee et al further teach modulating the temperature of supplied gas in order to regulate temperature, par. 74).

For claim 9, Cadee et al teach that the temperature regulating mechanisms 220 and 410 supply the temperature regulating fluids to the immersion space forming member 12 as applied above, wherein the systems are independent of the immersion liquid supply system of immersion space forming member 12. Therefore the apparatus is capable of supplying the fluids while the optical path space is not filled with the first liquid and the structural limitations of claim 9 are met. See MPEP 2114, A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art

apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)

For claim 11, Cadée et al teach that the temperature regulating mechanism 220 has a temperature regulator that regulates the temperature of the temperature regulating fluid (par. 83), and the temperature regulating mechanism 410 has a temperature regulator 200 that regulates the temperature of the temperature regulating fluid (par. 87).

For claims 12-13, the apparatus of claim 11 is capable of achieving the claimed conditions, and therefore all structural limitations are met.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 10, 14-16, 20-22, 34-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadée et al (US 2006/0033892).

For claims 10 and 34, Cadée et al teach that the temperature regulating mechanism 410 utilizes a temperature regulating fluid to control heat loss due to evaporation of immersion liquid as applied above, but does not explicitly teach that the fluid in mechanism 410 is a liquid, or that the temperature regulating fluid is the same substance as the first liquid supplied to the optical path space.

However, Cadée et al do teach that heat loss in elements of the lithography

system due to evaporation can be compensated by modulating the temperature of the immersion liquid (fig. 5 par. 73), and therefore teach that immersion liquid has utility as a temperature regulating fluid.

It would have been obvious to one of ordinary skill in the art to use as a temperature regulating fluid the same substance as the first liquid supplied to the optical path space in order to simplify the apparatus/method.

For claim 14, Cadée et al teach that the immersion space forming member 12 includes a nozzle member in which a recovery passage connected to the recovery port that recovers the first liquid in the optical path space is provided (fig. 5 par. 5, supply and recovery indicated by directional arrows). Cadée et al as modified with respect to claims 10 and 34 above further teach that the temperature regulating mechanism supplies a second liquid (temperature regulated immersion liquid from system 410) for temperature regulation to the interior of the immersion space forming member 12 at portion 400 (fig. 14 par. 87), but do not explicitly state that the supply from mechanism 410 is connected to the recovery passage.

Cadée et al teach that temperature regulating fluid from portion 400 is recovered by a separate recovery passage (fig. 14) and fed back into system 410.

It would have been obvious to one of ordinary skill in the art to connect the temperature regulating fluid from mechanism 410 to the immersion liquid recovery passage in order to utilize the immersion recovery passage as the outlet from portion 400 in order to simplify the apparatus, particularly when the first and second liquids are of the same substance.

For claim 15, Cadee et al teach that the temperature regulating fluid can be supplied to portion 400 even while the first liquid exists in the optical path as shown in fig. 14. Therefore, Cadee et al as modified with respect to claims 10 and 14 teach that the second liquid is supplied to the recovery passage even while the first liquid exists in the optical path space.

For claim 16, Cadee et al teach a liquid recovery device that recovers the immersion liquid of the recovery passage (fig. 5 par. 5). Therefore, Cadee et al as modified with respect to claims 10 and 14 above teach a liquid recovery device that recovers the first and second liquids of the recovery passage.

For claims 20-22, Cadee et al meets all structural limitations as applied to claims 1, 10 and 14 above.

For claim 35, Cadee et al do not explicitly teach that the temperature of the temperature regulating fluid is substantially equal to or higher than the temperature of the liquid in the immersion space.

Cadee et al teach that the temperature of the temperature regulating fluid can be controlled with reference to immersion liquid temperature (par. 87), wherein one of ordinary skill in the art would have been able to determine appropriate temperatures for the temperature regulating fluid through routine experimentation. See MPEP 2144.05 (II): [W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235(CCPA 1955).

8. **Claims 6 and 31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadee et al (US 2006/0033892) in view of Nakano (JP 2002-005586, cited in IDS).

For claims 6 and 31, Cadee et al do not explicitly teach the temperature of the optical element is regulated at least while formation of the immersion space is deactivated.

Nakano teaches an exposure apparatus (fig.'s 19-20) comprising a temperature regulation jacket comprising a heating liquid for temperature regulation of a projection lens (fig.'s 1-9, abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus and method of Cadee et al to include the lens temperature regulation mechanism of Nakano in order to better control temperature fluctuations within the system.

9. **Claims 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadee et al (US 2006/0033892) as applied to claim 16 above, and further in view of Kemper et al (US 2006/0038968).

For claims 17-19, Cadee et al do not teach a recovery port having a porous member with aperture diameters which vary from one side of the aperture to another such that liquid is allowed to pass while gas is substantially prevented.

Kemper et al teach an exposure apparatus (fig. 1) having an immersion space forming member 12 (fig. 5, par. 53) comprising a recovery port 20 having a porous member 21 (fig.'s 6-7 par. 56), wherein the diameter of apertures 22 are larger on a lower surface than on an upper surface (fig. 7), and wherein the pressure of the

recovery passage is regulated so that the immersion liquid in the optical path space may pass through the porous member without substantial passing of gas (fig.'s 6-7 par. 57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Cadee et al to include the liquid recovery structure taught by Kemper et al in order to optimize liquid removal and evenness of flow.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US applications 11/662452 corresponding to US 2008/0018867 (see par. 109) and 11/634158 corresponding to US 2007/0132976 (see par. 192) have been reviewed for potential double patenting issues.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLIN KREUTZER whose telephone number is (571) 270-7931. The examiner can normally be reached on Mon - Thurs from 9 AM - 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. K./
Examiner, Art Unit 2882

6/17/2010

/Hung Henry Nguyen/
Primary Examiner of Art Unit 2882

Notice of References Cited	Application/Control No. 11/887,584	Applicant(s)/Patent Under Reexamination NAGASAKA ET AL.	
	Examiner COLIN KREUTZER	Art Unit 2882	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2006/0038968 A1	02-2006	Kemper et al.	355/018
*	B	US-2007/0132976 A1	06-2007	Nagasaka, Hiroyuki	355/057
*	C	US-2008/0018867 A1	01-2008	Fujiwara et al.	355/030
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Form PTO-1449 (REV. 1/06)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 134153		APPLICATION NO. 11/887,584	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Hiroyuki NAGASAKA et al.			
				FILING DATE October 1, 2007		GROUP 2851	
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number	Date	Name			
	1	2006/0061747 A1	03/23/06	ISHII			
	2	2006/0152698 A1	07/13/06	ISHII			
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EXAMINER		/Colin Kreutzer/			DATE CONSIDERED 06/17/2010		
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Date: February 2, 2010

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Examiner Initials	Cite No.	Including name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.					
	25	U.S. Patent Application serial No. 10/588,297 filed August 2, 2006					
EXAMINER /Colin Kreutzer/					DATE CONSIDERED 06/17/2010		
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Form PTO-1449 (REV. 1/06)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 134153	APPLICATION NO. 11/887,584
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANTS Hiroyuki NAGASAKA et al.	
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Examiner Initials	Cite No.	(Including Author, Title, Date, Pertinent Pages, etc.)					
EXAMINER /Colin Kreutzer/				DATE CONSIDERED 06/15/2010			
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Form PTO-1449 (REV. 1/06)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 134153		APPLICATION NO. 11/887,584	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANTS Hiroyuki NAGASAKA et al.			
				FILING DATE October 1, 2007			
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number	Date	Name			
FOREIGN PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation	
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	39	DD 224 448 A1	07/03/1985	Germany	X	X	
	40	JP A 08-130179	05/21/1996	Japan	X	X	
	41	JP A 2001-510577	07/31/2001	Japan		X	
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	50	JP A 2002-071514	03/08/2002	Japan	X	X	
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Examiner Initials	Cite No.	(Including Author, Title, Date, Pertinent Pages, etc.)					
EXAMINER /Colin Kreutzer/				DATE CONSIDERED 06/15/2010			
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Form PTO-1449 (REV. 1/06)		US Dept. of Commerce PATENT & TRADEMARK OFFICE		ATTY DOCKET NO. 134153		APPLICATION NO. 11/887,584	
INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT'S Hiroyuki NAGASAKA et al.			
				FILING DATE October 1, 2007			
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number	Date	Name			
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Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation	
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OTHER DOCUMENTS							
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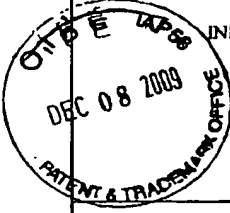
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 INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT(S) Hiroyuki NAGASAKA et al.			
				FILING DATE October 1, 2007		GROUP 2851	
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Examiner Initials	Cite No.	Document Number	Date	Name			
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Examiner Initials	Cite No.	Document Number	Date	Country	With English Abstract	With English Translation	
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Examiner Initials	Cite No.	Including name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.					
	5	International Search Report issued in Application No. PCT/JP2006/308040; mailed on July 18, 2006.					
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